Biological Assessment
for
Threatened and Endangered Species

Ewing Mountain Project

Mount Rogers National Recreation Area

Jefferson National Forest

Grayson, Wythe, and Carroll Counties, Virginia

Introduction

Forest Service Manual (FSM) Section 2672.41 requires a biological evaluation (BE) and/or biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BA are to:

1) ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or contribute to trends toward federal listing,
2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, and
3) provide a process and standard to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process using the best available science.

The Mount Rogers National Recreation Area supports known occurrences and suitable habitat for several TES species, all of which were considered in this analysis. This BA documents the analysis of potential effects of the proposed project to threatened and endangered species and associated habitat. It also serves as biological input into the environmental analysis for project-level decision making to ensure compliance with the ESA, National Environmental Policy Act (NEPA), and National Forest Management Act (NFMA).

Purpose and Need

The purpose and need of the Ewing Mountain Project is focused on addressing the difference between the existing condition and the desired condition and the goals and objectives of the Forest Plan. The intent is to create and enhance early successional, old-field, and grassland habitat, trend towards the desired mix of vegetation species, structure, and function, and provide wood products to help meet local demand.

Create and enhance habitat

Many mixed hardwood stands in the project area are gradually converting towards later successional shade tolerant species, such as maple and beech. There has also been a decrease in the structural diversity of theses stands; large tracts are in closed canopy conditions, limiting the range of suitable habitat.

A variety of tree species are encroaching on existing upland openings and early successional forested habitats are transitioning to the next successional stage within the project area. Areas that were once dominated by early successional, shade intolerant yellow pine such as shortleaf and pitch pine are being affected by insect attacks and encroachment of mountain laurel and rhododendron. These changes are contributing to the gradual loss of vital habitat components for many wildlife species including chestnut-sided warbler, American woodcock, least weasel, ruffed grouse, eastern wild turkey, and black bear.

The desired condition is a mix of forest communities, varying by the landtype association. Diverse composition and stocking within the project area would contribute to the establishment of shrubs and grasses needed by many game and non-game species. A mix of successional stages would be dispersed throughout the project area. In areas emphasizing ruffed grouse/woodcock habitat management, a minimum of ten percent early successional habitat is identified as a forest plan objective.

The conversion of white pine stands in the project area will improve habitat for early successional species and other watchable wildlife. The resulting old-field and grassland habitats will benefit species such as golden-winged warbler (*Vermivora chrysoptera*), loggerhead shrike (*Lanius ludovicianus*), orchard oriole (*Icterus spurius*), and white-tailed deer (*Odocoileus virginianus*).

To move the project area towards these desired conditions, there is a need to increase structural diversity while maintaining the resiliency of the mid and late seral successional habitat. There is also a need to maintain upland openings to prevent the encroachment of tree species, create and improve early successional forested habitat, and stimulate the growth of berry-producing shrubs and mast producing trees for wildlife habitat diversity.

Sustain forest and ecosystem health.

Within the project area, overstocked stands exhibiting reduced growth rates are susceptible to insect and disease infestations. The structural diversity across stands within the project area is limited. Competition for sun, water and nutrients is reducing the growth of the trees and greatly reducing the regeneration of early successional yellow pines and other important mast producing species. Non-native, invasive plants, such as autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), and tree-of-heaven (*Ailanthus altissima*), have been identified within the project area.

The Forest Plan describes a desired condition characterized by overall structural heterogeneity across multiple spatial scales. As the project area trends towards this desired condition, growth rates begin to rise and the regeneration of pines and important mast producing species occurs on appropriate sites. The presence and spread of non-native, invasive plants is limited.

There is a need to reduce stand density and open the canopy in the project area to sustain forest health, facilitate pine and oak regeneration, increase tree vigor and growth, improve wildlife habitat, enhance vegetative diversity, and minimize insect and disease attacks. There is also a need to reduce current infestations and future spread of non-native, invasive plants.

Offer wood products to contribute to the local market

Within the communities in and around the Mount Rogers NRA, there is an increasing demand for wood products to satisfy local markets. Many of the habitat improvement and forest health objectives in this

project can be accomplished through commercial harvest and thinning treatments that would help to meet this demand.

Goal 15 in the Forest Plan directs that "where forest management activities are needed and appropriate to achieve the desired composition, structure, function, productivity, and sustainability of forest ecosystems: a result of such activities will also be to provide a stable supply of wood products for local needs." Furthermore, Forestwide Objective 15.01 states, "Provide a total Timber sale Program of 4.0 million cubic feet (MMCF) annually" (Forest Plan, p. 2-32).

Proposed Action

The proposed Forest Service vegetative treatments will be designed to move conditions towards the desired habitat mix for the Management Prescriptions as described in the Forest Plan. All proposed activities occur within management prescriptions 7E2 (Dispersed Rec Areas – Suitable), 7G (Pastoral Landscapes), 8E1 (Ruffed Grouse/Woodcock Habitat Management), 9H (Maintenance/Restoration of Forest Communities), 7B (Scenic Corridors), and 7D (Concentrated Recreation Areas).

Timber Harvest

This proposal includes timber harvest within 59 hardwood, pine, and mixed hardwood/pine stands, on approximately 1,782 acres. Regeneration cuts will be used to create early successional habitat (ESH) across approximately 394 acres, a clearcut with type conversion treatment will create an additional 12 acres of ESH in the form of old-field and grassland habitat, and commercial thinning will open up the overstory canopy on approximately 1,375 acres.

Regeneration treatments will be followed by manual site preparation using chainsaws and supplemental planting as needed. A basal bark herbicide application of triclopyr (Garlon or generic equivalent) with an adjuvant or low volume foliar spray of glyphosate (Roundup or generic equivalent) may be used to control non-native species, invasive species, red maple (Acer rubrum), and other undesirable species throughout the regeneration treatments.

Type conversion of white pine stands will also include a basal bark herbicide application of triclopyr with an adjuvant or low volume foliar spray of glyphosate may be used to control non-native and undesirable species. The emphasis will be on the establishment of low grasses and wildflowers with some native deciduous and evergreen shrubs appropriate to the 7G Pastoral Landscapes management prescription.

Thinning treatments may be followed by basal bark application of triclopyr with an adjuvant to control invasive woody species such as autumn olive, multiflora rose, tree-of-heaven, and royal paulownia in these stands. Basal bark application is not a broadcast treatment method, only individual non-native invasive species would be treated if found in the units.

A low volume foliar spray of glyphosate or triclopyr will also be used along roads to control invasive woody species. It is expected that this will total approximately 158 acres of treatment, based on a 30-foot wide buffer.

Timber harvest operations will include a number of connected actions. Approximately sixteen acres of log landings will be constructed as needed to provide adequate space for safe and efficient logging, loading,

and hauling operations. Following completion of their use, these areas would be revegetated to prevent erosion and provide habitat and forage for wildlife. Approximately 5.1 miles of temporary road will be constructed to provide access to the treatment areas. These roads would be revegetated, bermed and closed to vehicle traffic after all proposed activities requiring access are completed. Approximately 0.5 miles of existing road in the Pellbridge area will be added to the Forest Service roads database, and Long Branch Road (FSR 794), approximately 1.1 miles, will be decommissioned.

Road maintenance will be performed on Forest System Roads (FSR) within the project area to facilitate project activity implementation. This will include brushing, ditch pulling, blading, culvert replacement, turn-widening, and gravel placement. The following FSRs would receive some or all of these maintenance activities.

Table 1. Project area road maintenance

Road Number	Road Name	Length (miles)
FSR 667	Tate	2.7
FSR 667A	Tate Spur A	0.3
FSR 690	Lick Branch	4.1
FSR 690D	Lick Branch D	0.6
FSR 797	Bournes Branch	2.1
FSR 992	Shepherds Corner	0.4
FSR 4050	Mikes Gap	1.8
FSR 4050A	Mikes Gap A	0.1
FSR 4051	Shiloh	0.5
FSR 4053	Wolfman	0.8
FSR 49710	Cripple Creek	1.9
FSR 49780	Ewing Mountain	1.9
FSR 49790	Barker	0.6
FSR *TBD*	*To be determined*	0.5

Wildlife Habitat Enhancement

Existing wildlife openings, consisting of small clearings and roads mowed as linear wildlife strips, occur sporadically throughout the project area. Management activities or natural processes maintain these areas in an open condition for the long-term. Temporary roads, skid trails, and landings used to support wood product removal provide temporary wildlife openings and will be seeded with a Forest Service approved seed mixture. Additional beneficial grasses, forbs, and shrubs may be planted as needed in existing and newly-created openings to contribute to wildlife and soil objectives.

To benefit ruffed grouse, the project will strive to create or maintain two drumming logs per acre on average across the project area.

Table 2. Proposed Action Summary Table

Habitat / Action	Extent[1]
Regeneration	
Clearcut Harvest	22 acres
Clearcut with reserves (15 – 30 residual BA)	300 acres
Coppice with reserves (15 – 25 residual BA)	24 acres
Shelterwood (15 – 25 residual BA)	19 acres
Shelterwood with reserves (15 – 30 residual BA)	29 acres
Total regeneration treatment	***394 acres***
Open Canopy Habitat	
Thinning [2]	1, 375 acres
Wildlife Habitat Enhancement	
Clearcut with type conversion	12 acres
Long Term Wildlife Openings - Management of existing wildlife openings including feathering (planting shrubs along hard edges) the edges / cutback field borders, overseeding a wildlife friendly mix, and controlling undesirable species	30 acres
Short Term Wildlife Openings – Planting with wildlife approved seed mixture of skid trails, landings and temporary roads where feasible	About 78 acres
Rainwater Vernal Pools – Where appropriate create rainwater vernal pools to provide additional water sources for wildlife and breeding habitat for amphibians.	Up to 4 ponds
Drumming log	2 per acre
Vegetative Treatments / Restoration Actions	

[1] Extent has been estimated for all activities and is subject to variability due to measurement error and necessary site-specific updates.

[2] The target BA will vary by stand based on current BA and stand type.

Habitat / Action	Extent[1]
Manual site preparation	394 acres
Southern yellow pine planting (within stands proposed for regeneration)	Up to 64 acres
Herbicide management of non-native invasive species within treatment stands	1,813 acres
Herbicide management of non-native invasive species along roads.	158 acres
Volume, Roads, Skid Trails, and Landings	
Temporary road	5.1 miles
Skid trails	148,816 feet; ~ 51 acres
Bladed skid trails	5,601 feet; ~ 2 acres
Log landings	61 landings; ~ 15.25 acres
System road maintenance	18.32 miles

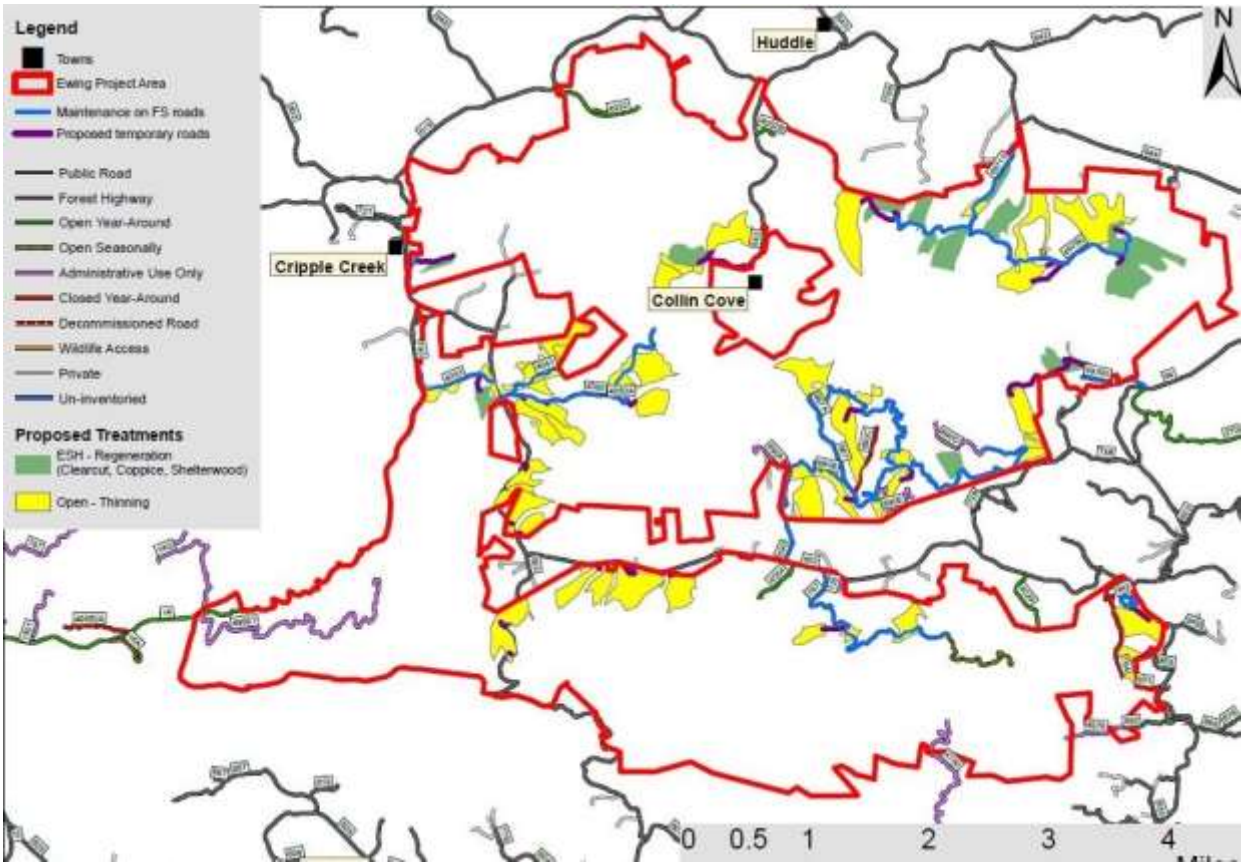

Figure 1. Ewing Roads and Proposed Treatments

TES Resource Protection Measures

- The following Region 8 sensitive plants will receive buffers from timber harvest activities and herbicide treatment unless it is deemed beneficial for the species by Forest Service specialists:
  - Rock Skullcap - 100 ft from center of location
  - American Barberry - 50 ft from center of location
  - Carolina Hemlock – for trees greater than 10 feet in height a tree length buffer will be used to protect individuals from timber harvest activities, regeneration patches of Carolina Hemlock greater than or equal 0.25 acres will be exclusion zone from timber harvest.

- To protect Indiana bat (*Myotis sodalis*) populations:
  - Leave all shagbark hickory trees 16 inches diameter at breast height (dbh) and larger, except when they pose a safety hazard.
  - Clearcut openings 10 to 25 acres in size will retain a minimum average of 6 snags or cavity trees per acre, 9 inches dbh or larger, scattered or clumped.

  - All other harvest methods (and clearcut openings 26 to 40 acres in size) will retain a minimum residual basal area of 15 ft.^{2} / acre (including 6 snags or cavity trees) scattered or clumped. Residual trees will be 6 inches dbh or larger, with priority given to the largest available trees that exhibit roost tree characteristics favored by Indiana bats.
  - Timber sale administrators or biologists will conduct and report normal inspections of all timber sales to ensure that measures to protect the Indiana bat have been implemented, including provisions for protecting residual. Unnecessary damage to residual trees will be documented in sale inspection reports and proper contractual or legal remedies will be taken.

- To facilitate the implementation of workable standards, the *Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan* (Conservation Plan) (Kirk and Huber, 2004) establishes a Conservation Zone, which will be applied within the Slate Spring Branch – Cripple Creek watershed (HUC 050500010803). The Conservation Zone will include the Riparian Corridor and the Channeled Ephemeral Zone.
- The Conservation Plan standards are consistent with the Forest Plan. If the standards are modified, an interdisciplinary analysis will be needed, and will include the US Fish and Wildlife Service.

Species Considered

Analysis of the proposed action was conducted using the best available science, including references from science-based websites, books, papers, reports, state and federal databases, field surveys, and professional opinions. Information from field visits, project area habitat conditions, species habitat requirements, species distributions, and a species list USFWS IPAC system were used to determine what species were likely to occur in the project area. The forest's GIS database was also examined to locate any records of threatened or endangered species in the project area or vicinity.

An official species list was requested from the USFWS IPAC system and was receive on February 22,2021. The IPAC system identified 8 species that are known to occur within the counties where the project is located. However, some of the species identified are either not located in the same watershed, a very far downstream of the project area, do not have suitable habitat in the project area, or have no known occurrences in the project area. See Table 3 for species considered and included/excluded from further analysis in this biologist assessment. For species excluded from further analysis, it was determined that the proposed project would have **no effect** on them because they either are unlikely to occur within the project area, are far enough downstream to not be affected by project implementation, or do not have suitable habitat present in the project area.

Table 3. Threatened and endangered species identified by the USFWS IPAC system and rationale for consideration in this analysis.

Common Name	Scientific Name	Status	Species Type	Considered but Excluded from further Analysis	Considered Further in the BA
Candy Darter	*Etheostoma osburni*	Endangered	Fish		✓
Candy Darter Critical Habitat	*Etheostoma osburni*	Endangered	Fish		✓
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	Endangered	Mammal	✓[2]	
Gray Bat	*Myotis grisescens*	Endangered	Mammal	✓[2]	
Indiana Bat	*Myotis sodalis*	Endangered	Mammal		✓
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Mammal		✓
Spruce-fire Moss Spider	*Microhexura montivaga*	Endangered	Arachnid	✓[2]	
Roan Mountain Bluet	*Hedyotis purpurea var. montana*	Endangered	Flowering Plant	✓[2]	
Rock Gnome Lichen	*Gymnoderma lineare*	Endangered	Lichen	✓[2]	

Notes:

[1] Project areas are not within the species' known range or watershed on the Mount Rogers National Recreation Area.

[2] Project areas are not currently appropriate or potentially appropriate habitat for the species.

Effects of the Proposed Action

Candy Darter

Introduction

The candy darter (*Etheostoma osburni*) is known from Cripple Creek and New River. It is found in rocky, typically clear, cold to warm, small to large creeks; adults generally occur in unsilted runs, riffles, and swift pockets of current in and around large rubble and boulders (Burkhead and Jenkins 1991, Jenkins and Burkhead 1994). Water temperature, excessive sedimentation, habitat fragmentation, water chemistry, water flow, and nonnative competition likely influenced the species in the past and contributed to its current condition, and may continue to affect some populations in the future. However, habitat stressors are not considered to be a primary source of risk to candy darter viability in the future. Hybridization with the closely related variegate darter (*Etheostoma variatum*) appears to be having, and will continue to have, the greatest influence on candy darter populations and the candy darter's overall viability within the next 25 years (Federal Register 2018). Since the variegate darter is not in Cripple Creek or mount rogers portions of the New River, it is not an immediate threat to the candy darter in the project area.

Direct, Indirect, and Cumulative Effects

Effects to this Federally Endangered species were considered because the project area contains existing habitat immediately downstream from the proposed harvest areas. Ground disturbing activities can increase the amount of sediment delivered to streams and this may have negative effects to mussels, fish or other aquatic species. To address these concerns a "Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan" (Conservation Plan) was developed by the Forest in close coordination with the U.S. Fish and Wildlife Service. The Conservation Plan includes specific conservation measures to be implemented at the project level to protect water quality and habitat for aquatic species. The Forest Plan standards are consistent with those listed in the conservation plan. The hydrology report for this project addresses impacts of proposed activities on water quality. It is determined that there would be no measurable or observable direct, indirect, or cumulative effects upon water quality as a result of the proposed activities. Based on this hydrology report, previous monitoring, and implementation of plan standards, there will be minimal if any direct, indirect or cumulative effects to the candy darter in the Cripple Creek and New River watersheds.

Determination of Effects

Implementing this propose action may affect but is **not likely to adversely affect** this species because the conservation plan would be followed to ensure protection of aquatic resources in the project area. Implementation is also **not likely to adversely modify** critical habitat for the species downstream of the project area for the same reasons as listed above. No further consultation is needed for this species because the conservation measures developed in coordination with USFWS will be followed and serves as informal consultation between the USFS and USFWS.

Indiana Bat

Introduction

The overall range of this species extends from eastern Oklahoma north to Wisconsin and Michigan, east to New England, and south to northern Alabama (Natureserve, 2020). The distribution of Indiana bats is generally associated with limestone caves in the eastern U.S., and within this range, they occupy two distinct types of habitat. During winter, Indiana bats hibernate in caves referred to as hibernacula. Bats are often readily found and easily counted during this hibernation period. Census of hibernating Indiana bats is the most reliable method of tracking population trends range-wide, and winter distribution of the Indiana bat is well documented (USDA FEIS, 2014).

When not in hibernation Indiana Bats forage primarily for winged insects in wooded and semi-wooded habitats utilizing snags, hollow trees, and trees with loose bark as their preferred roost sites (Natureserve, 2020). Adults primarily forage within three miles of the occupied maternity roost. Maternity colonies of more than 100 adult females can be found roosting together under sloughing bark of dead and partially dead trees in forested settings (Callahan et al. 1997). Reproductive females may require multiple alternate roost trees to fulfill summer habitat needs.

Swarming of both males and females and subsequent mating activity occurs at cave entrances prior to hibernation. During this autumn swarming period, bats roost under sloughing bark and in cracks of dead, partially dead, and live trees in proximity to the cave used for hibernation (USDA FEIS, 2014). Indiana bat is one of the species effected by White Nose Syndrome (WNS) and has declined across its range due to fungus infections. Hibernacula and summer roost protection are critical to the survival of this species.

There is currently no critical habitat for this species, known hibernacula or known summer roost sites within the project area.

Effects to the federally endangered Indiana bat (*Myotis sodalis*) were considered in this BE/BA because it is assumed the entire Forest is potential habitat for this species. See USFWS's Biological Opinion (BO) of January 13, 2004 and this agency's Final Environmental Impact Statement and Record of Decision for the Revised Land and Resource Management Plan, herein referred to as the Jefferson Forest Plan.

Direct, Indirect, and Cumulative Effects

During past and recent general project surveys and visits to the site, no Indiana bats were seen in the project area even though potential habitat (mature forests with trees having exfoliating bark) exists across the entire project area. The project area contains tree species of the size and type known to be used by the Indiana bat. Based upon professional judgment and known cave surveys, there are no caves with winter microclimate habitat conditions suitable for Indiana bats in the project area or within 2 miles (distance of cave protection area) of the project area. The area is also not within either the primary or secondary cave protection areas surrounding known hibernacula.

As stated in the BA, BO, and Jefferson Forest Plan, the retention of some snags, shagbark hickory, and hollow trees (as available) within areas proposed for silvicultural activities would allow potential Indiana bat roost sites to be maintained. Decreasing canopy closure in the harvest units would increase the degree of exposure of some potential maternity roost trees to solar radiation, providing improved thermal

conditions for raising young during a wide range of weather conditions. Pond/waterhole construction would increase the number of upland water sources and insects available for Indiana bats. Silvicultural treatments would create insect-rich foraging areas and flight corridors leading to any potential roost tree. These treatments would produce a mosaic of treatment areas intermixed with closed canopy mature and late successional forests, as well as mature forest in a structurally open condition. This will indirectly provide feeding areas since bats are known to forage within the canopy openings of upland forests, open woodlands, over clearings with early successional vegetation, and even along the borders of croplands, or wooded strips (fencerows), and over ponds. Contrastingly, negative impacts to the Indiana bat will be: (a) the slight chance that individuals or small groups of roosting bats (including summer maternity colonies) could be unintentionally killed by the intentional felling of trees harboring undetected roosts (e.g. dead limbs with loose bark, or small cavities in the boles), or by the accidental felling of occupied snags, or damaged or hollow trees during timber harvest, prescribed burning or other activities. Although the likelihood is very low, this project could result in the inadvertent loss of individual Indiana bats or small groups of Indiana bats, via removal of some large-diameter hardwood trees occupied by bats during the period from approximately April 1 to October 15.

This project-level analysis has tiered to the Jefferson National Forest's Revised Forest Plan and Final Environmental Impact Statement (FEIS). This project-level analysis includes, and is in addition to, the entire Indiana bat effects analysis (pages 3-175 to 3-184) documented in the Final EIS for the Jefferson Forest Plan. Because of its length, the FEIS discussion is not repeated here. However, findings of that analysis concluded that individual bats might be killed or harmed by such activities as associated with this project. Yet the U.S. Fish and Wildlife Service have determined that such take, within authorized levels, would be incidental take, and would not result in jeopardy to the Indiana bat. Timber harvest and access roads as proposed in this project, is about 1,834 acres of the 16,800 total acres allowed to be altered annually under the incidental take provisions of the Indiana bat Biological Opinion. Approximately 443 acres will be harvested in regeneration units. The remaining 1,431 acres will be thinned.

In implementing this project, on the ground Forest-wide protection and project monitoring standards FW-45 to FW-60 (inclusive) of the Jefferson Forest Plan will be implemented.

There is potential unoccupied habitat for the Indiana bat within the project area, but with implementation of measures described in the BO under the Terms and Conditions section of the Incidental Take Statement, there will be no cumulative effects.

The U.S. Fish and Wildlife Service supported the determination for the Indiana bat as follows:

In the January 13, 2004 U.S. Fish and Wildlife Service's Biological Opinion concerning the Indiana bat on the Jefferson Forest the following conclusion was reached, "After reviewing the current status of the Indiana bat, the environmental baseline for the action area, the effects of forest management and other activites on the JNF as described in the 2003 Revised Land and Resource Management Plan, and the cumulative effects, it is the FWS's biological opinion that implementation of the forest management and other activities as specified in the Jefferson Land and Resource Management Plan are not likely to jeopardize the continued existence of the Indiana bat. Critical habitat for this species has been designated in Kentucky, Tennessee, Illinois, Indiana, Missouri, and West Virginia. However, this action does not affect those areas and no destruction or adverse modification of that critical habitat will occur as a result of JNF management activities" Therefore there will be no cumulative effects to the Indiana bat.

Determination of Effects

Implementing this propose action may affect but is **likely to adversely affect** this species but these actions are covered under the incidental take given in the Forest BO.

Northern Long-eared Bat

Introduction

This species was listed as threatened on April 2, 2015 due to rapid population declines caused by White Nose Syndrome (WNS). The range of the northern long-eared bat includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In Virginia, the Northern Long-eared bat (NLEB) was known to occur in every county of the state and prior to WNS was the most commonly captured bat in summer mist-net surveys.

The NLEB is insectivorous and migratory, hibernating in caves and mines during the winter and occupying forests in the summer for feeding and reproduction (USDI, 2016). They typically use large caves or mines with large passages and entrances, constant temperatures, and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. During winter hibernation in hibernaculum, NLEB are difficult to locate in bat survey efforts (pers. Com. With Rick Reynolds, VDGIF 2019). In hibernacula they are found in small crevices or cracks, often with only the nose and ears visible.

During summer, northern long-eared bats roost singly or in colonies often in cavities, or in crevices, of both live and dead trees. This bat seems opportunistic in selecting roosts, using tree species based on suitability to provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. In late spring pregnant females fly to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed (USDI 2015b, USDI 2016). Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Adult northern long-eared bats can live up to 19 years. Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces (USDI 2015b, USDI 2016).

Direct, Indirect, and Cumulative Effects

The USFWS completed a Biological Opinion (BO) on August 5, 2015 for the continued implementation of Forest Plans in the Southern Region, including the George Washington & Jefferson National Forests, related to effects on the northern long-eared bat. The BO relied on continued implementation of existing Forest Plans and excepted activities as described in the April 2nd listing and associated interim 4(d) rule. On January 14, 2016 the FWS published the NLEB final 4(d) rule and it went into effect February 16, 2016. On February 11, 2016 the Southern Region of the Forest Service informed the FWS that the Forest Service will be implementing the NLEB final 4(d) rule using the voluntary process outlined in the January

5, 2016 Biological Opinion associated with the final 4(d) rule in lieu of the August 2015 BO specific to Forest Service activities.

Tree removal under certain conditions is an activity that is excepted from incidental take prohibitions in the final 4(d) rule. None of the 1,834 acres to be harvest in the Ewing Mount Project Area are within 0.25 mile of a known hibernacula or within 150 feet of a known, occupied maternity roost tree and are therefore excepted pursuant to the final 4(d) rule. Information furnished and displayed on the NLEB Winter Habitat & Roost Tree Application map maintained by VDGIF indicates the closest known hibernacula is approximately 18 miles from a known occupied cave.

Management actions and conservation measures stated in the BA, BO, and GWNF Forest Plan related to the Indiana bat will also be beneficial to the NLEB and will reduce potential impacts (see Indiana bat section).

Determination of Effects

Implementing this propose action may affect but is **likely to adversely affect** this species, but project actions are covered under the 4D rule.

Summary of determinations and signature of preparers

Based on the information and analysis above, the following determinations of effects were made for the activities proposed in this project.

Table 4. Summary of Determination, by Species

Species	Scientific Name	Status	Species Type	Excluded from further Analysis	Considered Further in the BA	Determination
Candy Darter	*Etheostoma osburni*	Endangered	Fish		✓	Not likely to adversely effect
Candy Darter Critical Habitat	*Etheostoma osburni*	Endangered	Fish		✓	Not likely to adversely modify
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	Endangered	Mammal	✓[2]		No effect
Gray Bat	*Myotis grisescens*	Endangered	Mammal	✓[2]		No effect

Species	Scientific Name	Status	Species Type	Excluded from further Analysis	Considered Further in the BA	Determination
Indiana Bat	*Myotis sodalis*	Endangered	Mammal		✓	Likely to adversely effect, Covered in BO issued by VAFO on January 13, 2004. All R&PM plus T&C followed along with Jefferson Plan Standards for project implementation. Will not exceed incidental take provided.
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Mammal		✓	Likely to adversely effect. Relying upon the findings of the 1/5/2016 Programmatic Biological Opinion for Final 4(d) Rule on the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions to fulfill our project-specific section 7 responsibilities.
Spruce-fire Moss Spider	*Microhexura montivaga*	Endangered	Arachnid	✓[2]		No effect
Roan Mountain Bluet	*Hedyotis purpurea var. montana*	Endangered	Flowering Plant	✓[2]		No effect
Rock Gnome Lichen	*Gymnoderma lineare*	Endangered	Lichen	✓[2]		No effect

Notes:

[1] Project areas are not within the species' known range or watershed on the Mount Rogers National Recreation Area.

[2] Project areas are not currently appropriate or potentially appropriate habitat for the species.

These determinations were made by qualified staff of the George Washington/Jefferson National Forests based on the best available science and other relevant information. If new information or changed circumstances affect these determinations, forest staff will reinitiate consultation pursuant to Forest Service policies and requirements under Sect. 7 of the Endangered Species Act.

/ s/ *Brittany B. Phillips* 04/20/2021

Brittany B. Phillips Date

Wildlife Biologist, Mount Rogers National Recreation Area

References

Cox, M. R., Willcox, E. V., Keyser, P. D., A. L. Vander Yacht. 2016. Bat Response to Prescribed Fire and Overstory Thinning in Hardwood Forest on the Cumberland Plateau, Tennessee. Forest Ecology and Management 359: 221-231.

Callahan, E. V., Drobney, R. D., and R. L. Clawson. 1997. Selection of Summer Roosting Sites by Indiana Bats (Myotis Sodalis) in Missouri. Journal of Mammalogy Volume 78 Number 3

Kirk, D. and Huber, F. 2004. George Washington and Jefferson National Forests Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan. USDA Forest Service, George Washington & Jefferson National Forests. Roanoke, VA.

NatureServe. 2020. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: Dec 18, 2020).

U.S. Department of Agriculture, Forest Service. 2004. Land and Resource Management Plan for the Jefferson National Forest.

U.S.D.A., Forest Service (USFS). 2014. Revised Land & Resource Management Plan for the George Washington National Forest. George Washington and Jefferson National Forests Supervisors Office, Roanoke, VA. https://www.fs.usda.gov/detail/gwj/landmanagement/planning/?cid=stelprd3799959

U.S.D.I., Fish and Wildlife Service (USFWS). 2 October 2013. 12-month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as endangered or threatened species; listing the northern long-eared bat as an endangered species. Federal Register 78(191):61046-61080.

U.S.D.I., Fish and Wildlife Service. 2004. Biological Opinion: Activities Affecting the Indian Bat on the Jefferson National Forest. U.S. Fish and Wildlife Service, Ecological Services Gloucester, VA. January 13, 2004. 18 pp.

U.S.D.I., Fish and Wildlife Service. 2015b. Biological Opinion: Activities Affecting the Northern Long-eared Bat on Southern Region National Forests. U.S. Fish and Wildlife Service, Southeast Regional Office, Atlanta, GA. August 5, 2015. 98 pp.

U.S.D.I., Fish and Wildlife Service. 2016a. Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions – USFWS Regions 2, 3, 4, 5, and 6. U.S. Fish and Wildlife Service, Midwest Regional Office, Bloomington, MN. January 5, 2016. 109 pp.

Virginia Department of Game and Inland Fisheries. 2019a. The Virginia Fish and Wildlife Information Service. Website: http://vafwis.org/fwis/?Menu=Home.Visitor+Options

Virginia Department of Game and Inland Fisheries. 2019b. The NLEB Winter Habitat and Roost Trees application: https://www.dgif.virginia.gov/wildlife/bats/northern-long-eared-bat-application/

Appendix A

OAR Step Down Process

A “step down” process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this step-down analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species’ ranges on the Forest are based on county records contained in such documents as the “Atlas of the Virginia Flora,” but are further refined when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times, range information clearly indicates a species will not occur in the project area due to the restricted geographic distribution of most TES species. When the project area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code "1" in the Appendix A table.

From past field surveys and knowledge of the area, and given the proposed action, those species which are analyzed and discussed further in this document are those that: a) are found to be located in the activity areas (OAR code “5”); b) were not seen during the survey(s), but possibly occur in the activity areas based on habitat observed during the survey(s) or field survey was not conducted when species is recognizable (OAR code “6”); c) for aquatic species, they are known or suspected downstream of project or activity areas and within identified geographic bounds of water resource cumulative effects analysis area (OAR code “8”) and d) federally listed mussel and/or fish species known in 6th level watershed of project areas. Conservation measures from USFWS/FS Conservation Plan applied (OAR code “9”).

A total of 8 species were identified by USFWS in IPAC at having potential to be in the project area. However since the IPAC species is generated using county lines and/or buffers some these species either do not have habitat in the project area or are located in a different watershed. These species will not be impacted by this project and will receive a no effect determination. More information on those species can be found in the determination table and species affected tables in the main body of this document. The following species are known or suspected to occur in or near the area or are potentially impacted by the proposed action and are coded OAR Code 6 or 9:

Documentation of Threatened and Endangered Species Occurrences for the Ewing Mountain Vegetation Project

Coding for Occurrence Analysis Results (OAR) for 61 species

Forest updated April 30, 2020 (based on Region 8 sensitive species list effective March 15, 2018)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
1	-	X	*Chrosomus cumberlandensis*	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
1	-	X	*Erimonax monachus*	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
1	-	X	*Erimystax cahni*	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
9	-	X	*Etheostoma osburni*	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S2
1	-	X	*Etheostoma percnurum*	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Noturus flavipinnis*	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
1	-	X	Percina rex	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
Mammal										
1	X	X	*Corynorhinus townsendii virginianus*	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. No occupied caves currently known on Forest.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
2	-	X	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
1	-	X	*Myotis grisescens*	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
6	X	X	*Myotis septentrionalis*	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
6	X	X	*Myotis sodalis*	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
INVERTEBRATE										
Mussel (Mollusk, Class Bivalvia)										
1	-	X	*Cumberlandia monodonta*	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
1	-	X	*Cyprogenia stegaria*	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
1	-	X	*Dromus dromas*	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Elliptio lanceolata*	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
1	-	X	*Epioblasma brevidens*	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma capsaeformis*	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma florentina aureola*	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
1	-	X	*Epioblasma torulosa gubernaculum*	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-
1	-	X	*Epioblasma triquetra*	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
1	-	X	*Fusconaia cor*	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Fusconaia cuneolus*	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Hemistena lata*	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Lampsilis abrupta*	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
1	-	X	*Lemiox rimosus*	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Parvaspina collina*	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: *Pleurobema collina*.	E	G1	S1	S1
1	-	X	*Pegias fabula*	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
1	-	X	*Plethobasus cyphyus*	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	-	X	*Pleurobema plenum*	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
1	-	X	*Pleuronaia dolabelloides*	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
1	-	X	*Ptychobranchus subtentum*	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA; Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
1	-	X	*Quadrula cylindrica strigillata*	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
1	-	X	*Quadrula intermedia*	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Quadrula sparsa*	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Villosa perpurpurea*	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Villosa trabalis*	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
2	-	X	*Microhexura montivaga*	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
Isopod (Crustacean, Order Isopoda)										
1	X	-	*Antrolana lira*	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
Crayfish (Crustacean, Order Decapoda)										
1	-	X	*Cambarus callainus*	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: *Cambarus veteranus*.	T	G2	S1S2	S1
Bee (Insect, Order Hymenoptera)										
10	X	X	*Bombus affinis*	Rusty-patched bumble bee	Bath Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
NON-VASCULAR PLANT										
Lichen										
2	-	X	*Gymnoderma lineare*	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-
VASCULAR PLANT										
1	-	X	*Betula uber*	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
1	X	-	*Boechera serotina*	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
1	X	X	*Echinacea laevigata*	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
1	X	-	*Helenium virginicum*	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
1	X	-	*Helonias bullata*	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-
1	-	X	*Iliamna corei*	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
3	X	X	*Isotria medeoloides*	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
2	X	X	*Scirpus ancistrochaetus*	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
2	-	X	*Spiraea virginiana*	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1

Legend For TES Species List In Occurrence Analysis Results:

OAR CODES:

1 = Project located out of known species range.
2 = Lack of suitable habitat for species in project area.
3 = Habitat present, species was searched for during field survey, but not found.
4 = Species occurs in project area, but outside of activity area.
5 = Field survey located species in activity area.
6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.

7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

SPECIES: The term "species" includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here "range" is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.
G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.
G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.
GH = Formally part of the world's biota with the exception that may be rediscovered.
GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.
GU = Possibly rare, but status uncertain and more data needed.
G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).
G_Q = Taxon has a questionable taxonomic assignment, such as G3Q.
G_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs

is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.
- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** – Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** – Not Applicable- A conservation status rank in not applicable because the species is not a suitable target for conservation activities.

These ranks should not be interpreted as legal designations.